

## WE CLAIM:

1. An apparatus for processing a television signal, wherein the television signal comprises programs and commercials, the apparatus  
5 comprising:

receiving means for receiving a television signal;

detecting means for detecting a commercial candidate section  
in the television signal;

- determining means for determining characteristics of the  
10 commercial candidate section; and

judgement means for judging whether or not the commercial  
candidate section is a commercial, based on the characteristics  
detected by the determining means.

- 15 2. The apparatus of claim 1, wherein:

the commercial candidate section comprises scene changes;

and

the determining means comprises means for determining a  
frequency of the scene changes in the commercial candidate section.

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3. The apparatus of claim 1, wherein the determining means  
comprises:

periodicity detecting means for detecting whether or not the  
audio signal in the commercial candidate section has a periodicity;

25 and

periodicity calculation means for calculating the periodicity  
detected by the periodicity detecting means.

4. The apparatus of claim 1, wherein:

the commercial candidate section comprises an audio signal with periodicity; and

the determining means comprises means for determining a  
5 degree of continuity of the periodicity of the audio signal.

5. The apparatus of claim 1, wherein:

the commercial candidate section comprises a video signal with repetition; and

10 the determining means comprises means for determining the repetition of the video signal in the commercial candidate section.

6. The apparatus of claim 1, wherein the determining means comprises means for determining whether or not a telop exists in the  
15 video signal of the commercial candidate section.

7. The apparatus of claim 1, wherein the determining means comprises means for determining whether or not a character exists in the video signal of the commercial candidate section.

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8. The apparatus of claim 1, wherein the determining means comprises means for determining a quietness rate in the commercial candidate section.

25 9. The apparatus of claim 1, wherein:

the television signal comprises quiet frames; and

the detecting means comprises means for detecting quiet frames of the television signal which are disposed between a program and a commercial candidate section.

10. An apparatus for processing a television signal, wherein the television signal comprises programs, commercials and scene changes, the apparatus comprising:

receiving means for receiving a television signal;

5 commercial candidate section detecting means for detecting a commercial candidate section in the television signal;

frequency determining means for determining a frequency of scene changes in the commercial candidate section and for increasing a commercial characteristic value if the frequency of scene changes is above a predetermined level;

10 periodicity determining means for determining whether or not the audio signal in the commercial candidate section has a periodicity, for calculating a level of periodicity detected and for increasing a commercial characteristic value if the calculated periodicity is above a predetermined level;

15 continuity determining means for determining a level of continuity of the periodicity of the audio signal in the commercial candidate section and for increasing a commercial characteristic value if the continuity is above a predetermined level;

20 repetition determining means for determining a level of repetition of the video signal in the commercial candidate section and for increasing a commercial characteristic value if the repetition is above a predetermined level;

25 telop detecting means for detecting a telop in the video signal of the commercial candidate section and for increasing a commercial characteristic value if a telop is detected;

character detecting means for detecting a character in the video signal of the commercial candidate section and for increasing a commercial characteristic value if a character is detected;

quietness rate determining means for determining the quietness rate of the commercial candidate section and for increasing a commercial characteristic value if the quietness rate is below a predetermined level; and

- 5 judgement means for judging whether or not the commercial candidate section is a commercial, based on the commercial characteristic value resulting from the operations of the frequency determining means, the periodicity determining means, the continuity determining means, the repetition determining means, the telop  
10 determining means, the character determining means and the quietness rate determining means.

11. An apparatus for processing a television signal, wherein the television signal comprises an audio signal and a video signal, the  
15 apparatus comprising:  
receiving means for receiving the television signal;  
determining means for determining a quiet threshold value from the television signal;  
comparing means for making a comparison of the audio signal  
20 and the quiet threshold value; and  
judging means for judging whether or not a portion of the television signal is a commercial candidate section according to the comparison.

- 25 12. The apparatus of claim 11, wherein:  
the television signal comprises scene changes;  
the determining means comprises means for detecting the scene changes and means for detecting the audio signal during the scene changes; and

the determining means determines the quiet threshold value based on the audio signal at the scene changes.

13. The apparatus of claim 11, wherein:

5 the television signal comprises an audio multiplex mode signal;  
the determining means comprises means for detecting the audio multiplex mode from the audio multiplex mode signal and means for detecting the audio signal when the audio multiplex mode changes; and

10 the determining means determines the quiet threshold value based on the audio signal at the time the audio multiplex mode changes.

14. The apparatus of claim 11, wherein:

15 the television signal comprises a program start time;  
the determining means comprises means for detecting the program start time and means for detecting the audio signal at the program start time; and

20 the determining means determines the quiet threshold value based on the audio signal at the program start time.

15. The apparatus of claim 11, wherein:

the television signal comprises a program end time;  
the determining means comprises means for detecting the program end time and means for detecting the audio signal at the program end time; and

25 the determining means determines the quiet threshold value based on the audio signal at the program end time.

16. The apparatus of claim 11, wherein:

the television signal comprises an AGC signal;

the determining means comprises means for detecting the  
AGC signal and means for detecting the audio signal; and

5 the determining means determines the quiet threshold value  
based on the audio signal and the AGC signal.

17. The apparatus of claim 11, wherein:

the video signal comprises a brightness level;

10 the determining means comprises means for determining the  
brightness level and means for detecting the audio signal; and

the determining means determines the quiet threshold value  
based on the audio signal and the brightness level.

15 18. The apparatus of claim 11, wherein:

the television signal is organized in channels;

the determining means comprises selecting means for  
selecting one or more channels of the television signal; and

20 the determining means determines the quiet threshold value  
based on the audio signal of each channel selected by the selecting  
means.

19. The apparatus of claim 18, wherein the determining means  
determines the quiet threshold value at a predetermined time interval.

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20. The apparatus of claim 18, further comprising:

storing means for storing a previous quiet threshold value;

quiet threshold value comparing means for determining  
whether the new quiet threshold value based on the audio portion of

each selected channel of the television signal is smaller than the previous quiet threshold value; and

means for outputting the new quiet threshold value to the storing means if the quiet threshold value comparing means  
5 determines that the new quiet threshold value is smaller than the previous quiet threshold value.

21. An apparatus for processing a television signal, wherein the television signal comprises programs and commercials, the apparatus  
10 comprising:

a receiver for receiving a television signal;

a first detector for detecting a commercial candidate section in the television signal;

a second detector for detecting characteristics of the  
15 commercial candidate section; and

a judgment circuit for judging whether or not the commercial candidate section is a commercial, based on the characteristics detected by the second detector.

20 22. The apparatus of claim 21, wherein:

the commercial candidate section comprises scene changes; and

the second detector detects the frequency of the scene changes in the commercial candidate section.

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23. The apparatus of claim 21, wherein:

the commercial candidate section comprises an audio signal which has a periodicity; and

the second detector detects the periodicity of the audio signal in the commercial candidate section.

24. The apparatus of claim 21, wherein:

5 the commercial candidate section comprises an audio signal with periodicity; and

the second detector detects a continuity of the periodicity of the audio signal in the commercial candidate section.

10 25. The apparatus of claim 21, wherein:

the commercial candidate section comprises a video signal with repetition; and

the second detector detects repetition of the video signal in the commercial candidate section.

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26. The apparatus of claim 21, wherein the second detector determines whether or not a telop exists in the video signal of the commercial candidate section.

20 27. The apparatus of claim 21, wherein the second detector determines whether or not a character exists in the video signal of the commercial candidate section.

28. The apparatus of claim 21, wherein the second detector  
25 detects a quietness rate of the commercial candidate section.

29. The apparatus of claim 21, wherein:

the television signal comprises quiet frames; and

the first detector detects quiet frames of the television signal



which are disposed between a program and a commercial candidate section.

30. An apparatus for processing a television signal, wherein the television signal comprises programs, commercials and scene changes, the apparatus comprising:
- a receiver for receiving a television signal;
  - a commercial candidate section detecting circuit for detecting a commercial candidate section in the television signal;
  - 10 a commercial characteristic value counter for storing a previous commercial characteristic value, for receiving a commercial characteristic value signal and for adding a commercial characteristic value from the commercial characteristic value signal to the previous commercial characteristic value;
  - 15 a frequency determining circuit for determining a frequency of scene changes in the commercial candidate section and for sending a commercial characteristic value signal to the commercial characteristic value counter if the frequency of scene changes is above a predetermined level;
  - 20 a periodicity determining circuit for detecting whether or not the audio signal in the commercial candidate section has a periodicity, for calculating a level of periodicity detected and for sending a commercial characteristic value signal to the commercial characteristic value counter if the calculated periodicity is above a
  - 25 predetermined level;
  - a continuity determining circuit for determining a level of continuity of the periodicity of the audio signal in the commercial candidate section and for sending a commercial characteristic value

signal to the commercial characteristic value counter if the continuity is above a predetermined level;

5 a repetition determining circuit for determining a level of repetition of the video signal in the commercial candidate section and for sending a commercial characteristic value signal to the commercial characteristic value counter if the repetition is above a predetermined level;

10 a telop detecting circuit for detecting a telop in the video signal of the commercial candidate section and for sending a commercial characteristic value signal to the commercial characteristic value counter if a telop exists;

15 a character detecting circuit for detecting a character in the video signal of the commercial candidate section and for sending a commercial characteristic value signal to the commercial characteristic value counter if a character is detected;

20 a quietness rate determining circuit for determining the quietness rate of the commercial candidate section and for sending a commercial characteristic value signal to the commercial characteristic value counter if the quietness rate is below a predetermined level; and

a judgement circuit for judging whether or not the commercial candidate section is a commercial, based on the commercial characteristic value in the commercial characteristic value counter.

25 31. An apparatus for processing a television signal, wherein the television signal comprises an audio portion, the apparatus comprising:

a receiver for receiving the television signal;

a quiet threshold value determining circuit for determining a quiet threshold value from the television signal;

a comparator for making a comparison of the audio portion of the television signal and the quiet threshold value; and

5 a judging circuit for judging whether or not a portion of the television signal is a commercial candidate section according to the comparison.

32. The apparatus of claim 31, wherein:

10 the television signal comprises scene changes;

the quiet threshold value determining circuit comprises a scene change detector and an amplitude detector for measuring the amplitude of the audio portion of the television signal during the scene changes; and

15 the quiet threshold value determining circuit determines the quiet threshold value based on the audio portion of the television signal at the scene changes.

33. The apparatus of claim 31, wherein:

20 the television signal comprises an audio multiplex mode signal;

the quiet threshold value determining circuit comprises an audio multiplex mode detector for determining the state of the audio multiplex mode signal and an amplitude detector for measuring the amplitude of the audio signal when the audio multiplex mode

25 changes; and

the quiet threshold value determining circuit determines the quiet threshold value based on the audio signal at the time the audio multiplex mode changes.

34. The apparatus of claim 31, wherein:

the television signal comprises a program start time;

the quiet threshold value determining circuit comprises a  
program start time detector and an amplitude detector for measuring

5 the amplitude of the audio signal the audio signal at the program  
start time; and

the quiet threshold value determining circuit determines the  
quiet threshold value based on the amplitude of the audio signal at  
the program start time.

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35. The apparatus of claim 31, wherein:

the television signal comprises a program end time;

the quiet threshold value determining circuit comprises a  
program end time detector and an amplitude detector for measuring

15 the amplitude of the audio signal the audio signal at the program end  
time; and

the quiet threshold value determining circuit determines the  
quiet threshold value based on the amplitude of the audio signal at  
the program end time.

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36. The apparatus of claim 31, wherein:

the television signal comprises an AGC signal;

the quiet threshold value determining circuit comprises a  
voltage detector for detecting amplitude of the AGC signal and an

25 amplitude detector for measuring the amplitude of the audio signal;  
and

the quiet threshold value determining circuit determines the  
quiet threshold value based on the audio signal and the AGC signal.

37. The apparatus of claim 31, wherein:

the video signal comprises a brightness level;

the quiet threshold value determining circuit comprises a  
brightness detection circuit for determining the brightness level of  
the video signal and an amplitude detector for measuring the  
amplitude of the audio signal; and

the quiet threshold value determining circuit determines the  
quiet threshold value based on the amplitude and the brightness  
level.

38. The apparatus of claim 31, wherein:

the television signal is organized in channels;

the quiet threshold value determining circuit comprises a  
channel selector for selecting one or more channels of the television  
signal; and

the quiet threshold value determining circuit determines the  
quiet threshold value based on the audio portion of each channel of  
the television signal selected by the selecting means.

39. The apparatus of claim 38, wherein the quiet threshold value  
determining circuit determines the quiet threshold value at a  
predetermined time interval.

40. The apparatus of claim 38, further comprising:

a memory for storing a previous quiet threshold value;

a quiet threshold value comparing circuit for comparing the  
quiet threshold value based on the audio portion of each channel of  
the television signal with the previous quiet threshold value and for  
outputting the smaller of the two values to the memory.

41. A method for processing a television signal, wherein the television signal comprises programs and commercials, the method comprising:

- a receiving step of receiving a television signal;
- 5 a detecting step of detecting a commercial candidate section in the television signal;
- a determining step of determining characteristics of the commercial candidate section; and
- 10 a judgement step of judging whether or not the commercial candidate section is a commercial, based on the characteristics detected in the determining step.

42. The method of claim 41, wherein:

- the commercial candidate section comprises scene changes;
- 15 and
- the determining step comprises the step of determining the frequency of the scene changes in the commercial candidate section.

43. The method of claim 41, wherein the determining step

20 comprises:

- a periodicity determining step of determining whether or not the audio signal in the commercial candidate section has a periodicity; and
- 25 a periodicity calculating step of calculating the periodicity determined in the periodicity determining step.

44. The method of claim 41, wherein:  
the commercial candidate section comprises an audio signal  
which has a periodicity; and  
the determining step comprises the step of determining the  
5 continuity of the periodicity.

45. The method of claim 41, wherein:  
the commercial candidate section comprises a video signal  
which has repetition; and  
10 the determining step comprises the step of determining the  
amount of repetition of the video signal in the commercial candidate  
section.

46. The method of claim 41, wherein the determining step  
15 comprises the step of determining whether a telop exists in the video  
signal of the commercial candidate section.

47. The method of claim 41, wherein the determining step  
comprises the step of determining whether a character exists in the  
20 video signal of the commercial candidate section.

48. The method of claim 41, wherein the determining step  
comprises the step of determining a quietness rate of the commercial  
candidate section.

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49. The method of claim 41, wherein:

the television signal comprises quiet frames; and

the detecting step comprises the step of detecting quiet  
frames of the television signal which are disposed between a  
5 program and a commercial candidate section.

50. A method for processing a television signal, wherein the  
television signal comprises programs, commercials and scene  
changes, the method comprising:

10 a receiving step of receiving a television signal;

a commercial candidate section detecting step of detecting a  
commercial candidate section in the television signal;

a frequency determining step, comprising the steps of  
determining a frequency of scene changes in the commercial  
15 candidate section and of increasing a commercial characteristic value  
if the frequency of scene changes is above a predetermined level;

a periodicity determining step, comprising the steps of  
determining a periodicity of the audio signal in the commercial  
candidate section and of increasing a commercial characteristic value  
20 if the periodicity is above a predetermined level;

a continuity determining step, comprising the steps of  
determining a continuity of a periodicity of the audio signal in the  
commercial candidate section and of increasing a commercial  
characteristic value if the continuity is above a predetermined level;

25 a repetition detecting step, comprising the steps of detecting a  
repetition of the video signal in the commercial candidate section and  
of increasing a commercial characteristic value if the repetition is  
above a predetermined level;



a telop searching step, comprising the steps of searching for a telop in the video signal of the commercial candidate section and of increasing a commercial characteristic value if a telop is detected;

5 a character searching step, comprising the steps of searching for a character in the video signal of the commercial candidate section and of increasing a commercial characteristic value if a characters is detected;

10 a quietness rate determining step, comprising the steps of determining the quietness rate of the commercial candidate section and of increasing a commercial characteristic value if the quietness rate is below a predetermined level; and

15 a judgement step of judging whether or not the commercial candidate section is a commercial, based on the commercial characteristic value after the preceding steps are performed.

51. A method of processing a television signal, wherein the television signal comprises an audio signal and a video signal, the method comprising:

20 a receiving step of receiving the television signal;  
a determining step of determining a quiet threshold value from the television signal;

a comparing step of making a comparison of the audio signal and the quiet threshold value; and

25 a judging step of judging whether or not a portion of the television signal is a commercial candidate section according to the comparison.

52. The method of claim 51, wherein the television signal comprises scene changes and wherein the determining step comprises:

- a step of detecting the scene changes;
- 5 a step of detecting the audio signal during the scene changes;
- and
- a step of determining the quiet threshold value based on the audio signal at the scene changes.

10 53. The method of claim 51, wherein the television signal comprises an audio multiplex mode signal and wherein the determining step comprises:

- a step of detecting the audio multiplex mode from the audio multiplex mode signal;
- 15 a step of detecting the audio signal when the audio multiplex mode changes; and
- a step of determining the quiet threshold value based on the audio signal at the time the audio multiplex mode changes.

20 54. The method of claim 51, wherein the television signal comprises a program start time and wherein the determining step comprises:

- a step of detecting the program start time;
- a step of detecting the audio signal at the program start time;
- 25 and
- a step of determining the quiet threshold value based on the audio signal at the program start time.

55. The method of claim 51, wherein the television signal comprises a program end time and wherein the determining step comprises:

- a step of detecting the program end time;
- 5 a step of detecting the audio signal at the program end time;
- and
- a step of determining the quiet threshold value based on the audio signal at the program end time.

10 56. The method of claim 51, wherein the television signal comprises an AGC signal and wherein the determining step comprises:

- a step of detecting the AGC signal;
- a step of detecting the audio signal; and
- 15 a step of determining the quiet threshold value based on the audio signal and the AGC signal.

57. The method of claim 51, wherein the video signal comprises a brightness level and wherein the determining step comprises:

- 20 a step of determining the brightness level;
- a step of detecting the audio signal; and
- a step of determining the quiet threshold value based on the audio signal and the brightness level.

25 58. The method of claim 51, wherein the television signal is organized in channels and wherein the determining step comprises:

- a selecting step of selecting each channel of the television signal; and
- a calculating step of calculating the quiet threshold value

based on the audio portion of each channel of the television signal selected by the selecting step.

59. The method of claim 58, wherein the calculating step  
5 calculates the quiet threshold value at a predetermined time interval.

60. The method of claim 58, further comprising:  
a storing step of storing a previous quiet threshold value;  
a quiet threshold value comparing step of determining whether  
10 the new quiet threshold value based on the audio portion of each  
channel of the television signal is smaller than the previous quiet  
threshold value; and  
a step of outputting the new quiet threshold value to the  
storing step if the new quiet threshold value is smaller than the  
15 previous quiet threshold value.

61. A provision medium for providing a program which is readable  
by a computer to control an apparatus to execute a detection routine  
for detecting commercials included in a television broadcast, the  
20 detection routine comprising:  
a receiving step of receiving a television signal;  
a detecting step of detecting a commercial candidate section  
in the television signal;  
a determining step of detecting characteristics of the  
25 commercial candidate section; and  
a judgement step of judging whether or not the commercial  
candidate section is a commercial, based on the characteristics  
detected in the determining step.

62. The provision medium of claim 61, wherein:  
the commercial candidate section comprises scene changes;  
and

the determining step comprises the step of determining the  
5 frequency of the scene changes in the commercial candidate section.

63. The provision medium of claim 61, wherein:  
the commercial candidate section comprises an audio signal  
which has a periodicity; and

10 the second determining step comprises the step of determining  
the periodicity of the audio signal in the commercial candidate  
section.

64. The provision medium of claim 61, wherein:

15 the commercial candidate section comprises an audio signal  
which has a periodicity; and

the determining step comprises the step of determining a level  
of continuity of the periodicity of the audio signal in the commercial  
candidate section.

20 65. The provision medium of claim 61, wherein:

the commercial candidate section comprises a video signal  
which has repetition; and

the determining step comprises the step of determining a level  
of repetition of the video signal in the commercial candidate section.

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66. The provision medium of claim 61, wherein the determining  
step comprises the step of determining whether a telop exists in the  
video signal of the commercial candidate section.



70. A provision medium for providing a program which is readable by a computer to control an apparatus to execute a detection routine for detecting commercials included in a television broadcast, the detection routine comprising:

- 5           a receiving step of receiving a television signal;
- a commercial candidate section detecting step of detecting a commercial candidate section in the television signal;
- a frequency determining step, comprising the steps of  
10       determining a frequency of scene changes in the commercial candidate section and of increasing a commercial characteristic value if the frequency of scene changes is above a predetermined level;
- a periodicity determining step, comprising the steps of  
15       determining a periodicity of the audio signal in the commercial candidate section and of increasing a commercial characteristic value if the periodicity is above a predetermined level;
- a continuity determining step, comprising the steps of  
20       determining a continuity of a periodicity of the audio signal in the commercial candidate section and of increasing a commercial characteristic value if the continuity is above a predetermined level;
- a repetition detecting step, comprising the steps of detecting a repetition of the video signal in the commercial candidate section and of increasing a commercial characteristic value if the repetition is above a predetermined level;
- a telop searching step, comprising the steps of searching for a  
25       telop in the video signal of the commercial candidate section and of increasing a commercial characteristic value if a telop is detected;

a character searching step, comprising the steps of searching for a character in the video signal of the commercial candidate section and of increasing a commercial characteristic value if a characters is detected;

5 a quietness rate determining step, comprising the steps of determining the quietness rate of the commercial candidate section and of increasing a commercial characteristic value if the quietness rate is below a predetermined level; and

10 a judgement step of judging whether or not the commercial candidate section is a commercial, based on the commercial characteristic value after the preceding steps are performed.

71. A provision medium for providing a program which is readable by a computer to control an apparatus to execute a detection routine for detecting commercials included in a television broadcast, the  
15 detection routine comprising:

a receiving step of receiving the television signal;

a determining step of determining a quiet threshold value from the television signal;

20 a comparing step of making a comparison of the audio signal and the quiet threshold value; and

a judging step of judging whether or not a portion of the television signal is a commercial candidate section according to the comparison.

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72. The provision medium of claim 71, wherein the television signal comprises scene changes and wherein the determining step comprises:

- a step of detecting the scene changes;
- 5 a step of detecting the audio signal during the scene changes;
- and
- a step of determining the quiet threshold value based on the audio signal at the scene changes.

10 73. The provision medium of claim 71, wherein the television signal comprises an audio multiplex mode signal and wherein the determining step comprises:

- a step of detecting the audio multiplex mode from the audio multiplex mode signal;
- 15 a step of detecting the audio signal when the audio multiplex mode changes; and
- a step of determining the quiet threshold value based on the audio signal at the time the audio multiplex mode changes.

20 74. The provision medium of claim 71, wherein the television signal comprises a program start time and wherein the determining step comprises:

- a step of detecting the program start time;
- a step of detecting the audio signal at the program start time;
- 25 and
- a step of determining the quiet threshold value based on the audio signal at the program start time.

75. The provision medium of claim 71, wherein the television signal comprises a program end time and wherein the determining step comprises:

- a step of detecting the program end time;
- 5 a step of detecting the audio signal at the program end time;
- and
- a step of determining the quiet threshold value based on the audio signal at the program end time.

10 76. The provision medium of claim 71, wherein the television signal comprises an AGC signal and wherein the determining step comprises:

- a step of detecting the AGC signal;
- a step of detecting the audio signal; and
- 15 a step of determining the quiet threshold value based on the audio signal and the AGC signal.

20 77. The provision medium of claim 71, wherein the video signal comprises a brightness level and wherein the determining step comprises:

- a step of determining the brightness level;
- a step of detecting the audio signal; and
- a step of determining the quiet threshold value based on the audio signal and the brightness level.

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78. The provision medium of claim 71, wherein the television signal is organized in channels and wherein the determining step comprises:

5 a selecting step of selecting each channel of the television signal; and

a calculating step of calculating the quiet threshold value based on the audio portion of each channel of the television signal selected by the selecting step.

10 79. The provision medium of claim 78, wherein the calculating step calculates the quiet threshold value at a predetermined time interval.

80. The provision medium of claim 78, further comprising:

15 a storing step of storing a previous quiet threshold value;

a quiet threshold value comparing step of determining whether the new quiet threshold value based on the audio portion of each channel of the television signal is smaller than the previous quiet threshold value; and

20 a step of storing the new quiet threshold value if the new quiet threshold value is smaller than the previous quiet threshold value.